

18

UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

UNITED STATES OF AMERICA,

Plaintiff and Counter-Defendant,

and

THE WAYNE COUNTY DEPARTMENT OF HEALTH,  
AIR POLLUTION CONTROL DIVISION,

Plaintiff,

Civil Action No. 77-71100  
Hon. John Feikens

v.

STATE OF MICHIGAN,

Defendant, Counter-Plaintiff  
and Cross-Plaintiff,

v.

CITY OF DETROIT, a municipal corporation,  
and DETROIT WATER AND SEWERAGE DEPARTMENT,

Defendants and Cross-Defendants,

v.

ALL COMMUNITIES AND AGENCIES UNDER  
CONTRACT WITH THE CITY OF DETROIT FOR  
SEWAGE TREATMENT SERVICES,

SUPPLEMENTAL ORDER  
RE: MATHEMATICAL  
MODEL OF SUBURBAN  
COLLECTION AND  
INTERCEPTOR SYSTEMS

v.

THE DETROIT AREA LAUNDRY POLLUTION  
CONTROL GROUP, a voluntary, non-  
profit, unincorporated association,  
AND ITS MEMBERS,

v.

THE FOOD AND ALLIED INDUSTRIES  
COMMITTEE OF METROPOLITAN DETROIT,  
a voluntary non-profit, unincorporated  
association, AND ITS MEMBERS,

Intervening Rate Challengers.

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1534

**SUPPLEMENTAL ORDER RE: MATHEMATICAL MODEL OF  
SUBURBAN COLLECTION AND INTERCEPTOR SYSTEMS**

At a session of the Court held at Detroit

on: \_\_\_\_\_

Present: Hon John Feikens

On February 22, 1991 this Court entered an order supporting the development of a mathematical model for the major components of Detroit's combined sewer collection and interceptor system. Subsequently, the City of Detroit amended its Contract No. CS-1049 with Camp, Dresser and McKee (CDM) to expand the scope of work to include modeling of suburban portions of the collection and interceptor system. A Technical Task Force was created to oversee the project and to assist the Detroit Water and Sewerage Department (DWSD) in directing the consultants in the completion of this work.

The prior order of this Court established a maximum budget for the work at \$1,800,000 based on the tasks presented in CDM's November 13, 1990 proposal, and specified that the costs for the work were to be apportioned initially to all DWSD customers as a "common to all cost", provided that the costs be subject to adjustment in connection with the "look-back" analysis.

On January 10, 1994 a presentation of the preliminary results of the modeling work was presented to this Court by DWSD and the project consultant, CDM. That presentation included a recommendation that additional work be undertaken to further evaluate control alternatives for combined sewer overflows (CSO's), and that the participation of the Technical Task Force be extended.

Based upon the recommendation of Dr. Bulkley, the Court finds

that the City of Detroit Water and Sewerage Department acting through its Board of Water Commissioners may enter into an expanded contractual relationship with Camp, Dresser & McKee by amendment of Contract CS-1049, the terms and conditions of which may be negotiated by DWSD and CDM to complete a full and thorough evaluation of CSO control alternatives. A description of the tasks to be included in this amendment is attached to this Order as Exhibit A. The additional costs for this work shall not exceed \$450,000. Consistent with this Court's prior Order of February 22, 1991 the cost thereof shall be paid by DWSD from system revenues, and shall be allocated on a common to all basis among system customers, subject to reallocation in the "look-back analysis" performed for the time period in which such costs are incurred.

The allocation of costs for the tasks identified in the amendment to the CDM contract, CS-1049, as "common to all costs" does not constitute an understanding or agreement by Detroit or any DWSD sewage disposal district, or customer municipality that any other costs that may be incurred in the future by DWSD for the design or construction of CSO facilities should be similarly allocated in any future rates. The Court's prior Order of February 22, 1991 is continued in effect and all costs incurred under Contract CS-1049 pursuant to the February 22, 1991 Order shall remain subject to reallocation at such time as the work authorized by this Order is completed and information required for such reallocation is available.

Nothing in this order shall be construed as an agreement by

any party to this litigation to the legal force or effect of the study, or the results or recommendations made or to be made by CDM therein, nor by consenting to this order does any party to this litigation waive any objection it may have to (1) the legal status or standing of the Technical Task Force; (2) any of the assumptions, proposals or recommendations made therein including but not limited to the concept of review and approval by the Task Force members and/or the DNR of any report generated by CDM. Each and every party to these proceedings preserves unimpaired any objection it may have to any aspect of the CDM work referred herein.

Based on the recommendation of Dr. Bulkley, the Court directs the City of Detroit Water and Sewerage Department to retain custody of the completed model along with any appropriate software and reports, and ensure that the model is kept up to date and maintained in good working order for continued use and application to the benefit of the entire sewer collection system. To that end, the Technical Task Force shall be maintained and convened from time to time as may be necessary to assist DWSD in the continued application and utilization of the model.

  
\_\_\_\_\_  
JOHN FEIKENS  
U.S. District Judge

C:\Walter\usa

*Aug. 15, 1994*

FILED 1994 AUG 17

**CDM**

environmental engineers, scientists,  
planners, & management consultants

EXHIBIT A

**CAMP DRESSER & McKEE**

One Woodward Avenue, Suite 1500  
Detroit, Michigan 48226  
313 963-1313

January 19, 1994

Mr. Gary Fujita  
Assistant Director of Wastewater Operations  
9300 Jefferson  
Detroit, Michigan 48209

Re: DWSD Collection System Modeling  
CS-1049 Amendment 4 Estimates

Dear Mr. Fujita:

We appreciate the opportunity we had on December 22, 1992 to review the project status and to discuss future activities on the GDRS CSO Modeling project, CS-1049. We feel that substantial progress has been made to date on the project and that the project has led to a better understanding of the operation of the system, including the impacts of the suburban influences on the City of Detroit collection and treatment system.

As you requested at that meeting, we have made revisions to the proposed Amendment 4 of CS-1049. The updated Scope of Services and the estimated level of effort are attached to this letter. This scope includes the groups of activities described in the table on the next page, with the costs summarized in the attached table.

The original CS-1049 contract was signed in 1988. This contract, and two subsequent amendments, provided an analysis of the DWSD collection system. This analysis focused on the City of Detroit system only with simplifying assumptions concerning the impacts of the suburban tributary areas. Amendment 3 of CS-1049 was ordered by the Federal Court in 1991 to address concerns raised by these suburban customers relative to the validity of the computer model and appropriately managing the interplay between the City of Detroit and these suburban customers.

Also attached to this letter is a table that provides detailed information on the level of effort and the specific personnel needed for each of these activities. This table includes the level of effort needed by both CDM and Applied Sciences, Inc. Billing rates are supplied at the top of the table. Total hours and dollars are supplied at the bottom and right of the table. The activity costs are summarized in the table on the following page. Note that the total upper limit for these scope items outlined is \$415,390. Of this, \$245,588 is needed to complete the evaluation of the alternatives currently envisioned, implementing the TRC recommendations, and preparing for and attending the technical and policy meetings currently envisioned.

Mr. Gary Fujita  
January 19, 1994  
Page 2

CAMP DRESSER & McKEE

A total of \$100,000 is included for unspecified work which may be determined by the technical committee as necessary as the alternative analysis proceeds. This effort will not be expended unless there is specific authorization given for these activities.

The remaining \$69,802 is required to prepare an estimate of the annual overflows during 1994 and to prepare the design storm runs necessary to prepare a family of curves for estimating overflow volume and duration from the City of Detroit.

Activity	Cost	Description
Finish Western Wayne County Sub-Model	\$21,616	Compile and complete the Western Wayne portion of the GDRS Model.
Complete Alternatives	\$160,528	Complete the alternatives analysis as outlined in Technical Memorandum 23. This includes contingency funds to perform an additional 4 continuous simulations, if necessary.
Meetings	\$16,892	Prepare for and conduct additional technical and policy meetings
TRC Recommendations	\$26,214	Includes review of the DCIA values, rainfall spatial variations, and meter error analysis.
Other Costs	\$20,338	Current ASI project costs as well as additional Other Direct Costs for this amendment.
Annual Estimate of Overflow	\$27,774	The overflows from the City of Detroit for the previous year will be estimated based on the available rainfall data.
Overflow Notification Calculations	\$42,028	Prepare the necessary design storm runs to prepare a family of curves that describe the overflow volume and duration for a range of storms.
Additional Services	\$100,000	Perform activities as designated by the technical committee and authorized by DWSD. This work is currently unspecified with specific work scopes needed prior to authorization of any work.

Note that we have included the "Annual Estimate of Overflow" and the "Overflow Notification Calculation" tasks in this amendment. The revised end date for CS-1049 would be June 30, 1994. All terms and conditions as well as overhead rates included in the original contract would remain in force for this amendment.

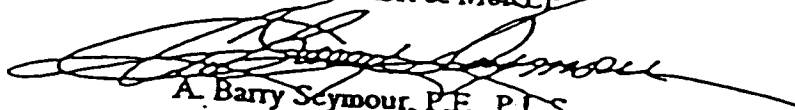
Mr. Gary Fujita  
January 19, 1994  
Page 3

CAMP DRESSER & McKEE

If you have any questions about this letter or any of the attachments, please call Mark  
TenBroek or me at (313) 963-1313.

Very truly yours,

CAMP DRESSER & McKEE



A. Barry Seymour, P.E., P.L.S.  
Senior Vice President

ABS/kak

Attachments

# DWSD CS-1049 Amendment 4

## Scope of Services

### 1-19-94

#### Project Completion Activities

##### 1. Finish Western Wayne County Sub-Model

	Hours	Totals
1. Finalize Area Data - Gather updated area and impervious area data from communities Wayne County communities. This information will be reviewed by Wayne County.	70 mh	
2. DCIA Calculations - Coordinate Wayne County community estimates of DCIA based on flow meter analysis of available data. This data will be reviewed by Wayne County.	50 mh	
3. Revise Models - Incorporate area data from above into the Western Wayne design storm and continuous models.	70 mh	
4. Update Results - Re-evaluate the calibration, design storm, and continuous modeling runs for the Western Wayne Models using this information from the Western Wayne update.	90 mh	280 mh

##### 2. Complete Alternatives

1. Re-evaluate Baseline - Prepare an updated analysis of the design and continuous models based on the new input from the Western Wayne system.	130 mh	
2. Update Planned Modifications - Incorporate finalized Rouge Demo modifications into models. The first step is to finalize the design criteria for these modifications from a number of different consultants.	130 mh	
3. Design Storm Alternative Runs - Perform the design storm runs based on these changes. These design storm runs include estimating the overflows for specific events under Phase I alternatives. Also prepare design storm runs for the rainfall spatial variation case, the West Arm Interceptor runs, and the operational optimization runs.	140 mh	
4. Compile Design Storm Results - Place the design storm information in the standard format for review by the technical committee. This includes preparation in tabular format showing all of the overflow locations as well as the summary overflow by jurisdiction.	100 mh	



# DWSD CS-1049 Amendment 4

## Scope of Services

### 1-19-94

5. Perform Continuous Runs - Prepare the continuous simulations for all the alternatives as outlined in the Alternatives Technical Memorandum 23. This includes Continuous Simulations B through H. Simulation G includes an estimated three simulations needed to define the 85% removal for the GDRS system. Simulation H will include a single optimal operational scenario. This scenario is based on the design storm simulation. 300 mh
6. Spatial Variation Investigation - Gather a continuous rainfall record from a year for up to 10 gages in the GDRS service area. This rainfall information will be gathered from the SEMCOG rainfall network. Perform continuous simulation using that information to estimate the annual overflows for a specific year. Use the baseline continuous model prepared for uniform rainfall for the same year to estimate of the reduction factor for this non-uniform rainfall distribution. 160 mh
7. Contingency Effort - Perform four additional continuous simulation runs if requested by the technical committee. 200 mh
8. Compile Continuous Results - Place the results of the continuous simulations in a form consistent with the baseline conditions output. This includes a tabulation of each of the overflow locations with the annual overflow volumes, expected overflow frequency, and expected overflow durations. In addition, tables of total overflow volumes by jurisdiction will be prepared. Prepare the WWTP operational outputs that define the total flow duration and event occurrence curves as described in Technical Memorandum 23. 220 mh
9. Alternative Cost Estimates - Prepare planning level cost estimates for the different alternatives described above. These cost estimates will use local costs for construction of existing surface and tunnel storage projects, as well as other alternative storage/treatment methodologies. 340 mh
10. Prepare Report Update - Provide update sections to the Model Status report to reflect the changes in the Western Wayne County area. Produce a printing of the revised sections for the existing 50 reports as well as 20 new copies of the complete report. 360 mh

# DWSD CS-1049 Amendment 4

## Scope of Services

### 1-19-94

- |  |       |         |
|--|-------|---------|
| 11. Alternatives Training - Provide training sessions on the operation of the design storm and the continuous model for the alternatives evaluation. | 70 mh | 2,150 m |
|--|-------|---------|

#### 3. Meetings

- |   |        |        |
|---|--------|--------|
| 1. Technical Meetings - These are the technical committee meetings that are needed over the remaining 6-months of the project. Estimate includes 6 additional meetings. | 120 mh |        |
| 2. Outline Policy Meetings - Two additional technical meetings are anticipated as part of this project.   | 20 mh  |        |
| 3. Prepare Presentation Materials - Prepare slides and handout packets for these sessions.  | 50 mh  |        |
| 4. Present Policy Meetings - Present the material as the Policy Meetings.   | 20 mh  | 210 mh |

#### 4. TRC Recommendations

- |   |        |        |
|---|--------|--------|
| 1. Imperviousness Investigations - Investigate total impervious estimates throughout the GDRS collection system service area. | 80 mh  |        |
| 2. DCIA Estimates - Bring the Western Wayne County DCIA estimates to closure  | 60 mh  |        |
| 3. Large Pipes Metering - Complete the large pipe flow metering analysis started for the HUF1 meter site                      | 120 mh |        |
| 4. Error Analysis Completion - Complete the consensus document between Steve Wright and ADS.                                  | 80 mh  | 340 mh |

#### 5. Annual Estimate of Overflow Frequency and Volume

- |   |        |        |
|---|--------|--------|
| 1. Estimate Rainfall - Gather rainfall from previous year for gages within the City of Detroit and the surrounding area                       | 80 mh  |        |
| 2. Prepare Hyetographs - Prepare annual rainfall hyetographs for these gage locations.  | 60 mh  |        |
| 3. Run Continuous Model - Run continuous model for previous year. This model will be prepared using the rainfall hyetographs described above. | 120 mh |        |
| 4. Prepare Overflow Estimates - Prepare overflow estimate at each overflow location that is part of the GDRS collection system model.         | 110 mh | 370 mh |

# DWSD CS-1049 Amendment 4

## Scope of Services

### 1-19-94

#### 6. Overflow Notification Calculations

- |  |        |        |
|--|--------|--------|
| 1. Develop Overflow Input Criteria - Work with the spill response consultant (ECT) to determine the necessary input requirements for the plume model. This   | 40 mh  |        |
| 2. Prepare Storm Matrix - Develop storm matrix for simulation events. This will include a range of rainfall event volumes and durations. Events are expected to include 10 different rainfall volumes with three different event durations   | 60 mh  |        |
| 3. Prepare Model Input - Each of the storm event volumes and durations will be included. Also, input for three different antecedent conditions will be prepared.   | 120 mh |        |
| 4. Perform Simulations - Perform the simulations for the storm matrix defined above. These simulations include running all 6 of the GDRS sub-models, where necessary, for establishing boundary conditions to the City of Detroit.   | 160 mh |        |
| 5. Compile Output - The output for the GDRS system will be used to prepare a family of overflow volume duration curves. These will be used to estimate the overflow volumes, their locations, and time over which they are expected to occur. This output will also be prepared so that using the appropriate antecedent conditions, rainfall start time, rainfall end times, and runoff volume can be determined as output. | 80 mh  |        |
| 6. Prepare Report - Prepare a report that describes the calculations performed, gives an explanation of the resulting output curves, and provides an explanation of the methodology needed to obtain the necessary outputs for the notification procedure.   | 110 mh | 570 mh |

#### 6. Additional Services

- |  |          |          |
|--|----------|----------|
| 1. Provide additional requested services. The nature of these additional services are not known at this time, but will be work requested by the technical committee. Specific authorization required prior to beginning work on any of these activities. | 1,388 mh | 1,388 mh |
|--|----------|----------|

TOTAL

5,308 mh



environmental engineers, scientists  
planners, & management consultants

CAMP DRESSER & McKEE

One Woodward Avenue, Suite 1500  
Detroit, Michigan 48226  
313 963-1313

January 19, 1994

Mr. Gary Fujita  
Assistant Director of Wastewater Operations  
9300 Jefferson  
Detroit, Michigan 48209

RE: DWSD Collection System Modeling  
Review of CS-1049 Out of Scope Items

Dear Mr. Fujita:

The proposed Amendment 4 of CS-1049 included a request for additional funding to cover a number of out of scope work items that either have been performed, or will be performed. These items were generated at the request of the GDRS Technical Committee, the Technical Review Committee (TRC), or by DWSD. Provided below is a listing of these out of scope items and an explanation of what was done or is planned to be performed as part of this Amendment number 4 of CS-1049:

- Rouge Valley District Base Data - Initial information was incomplete and not in the completed format anticipated in the original scope of services. Substantial work was needed to review the facility data provided by numerous consultants and reduce it to a format needed for input to the model. Model calibrations and alternative analysis were performed using this data.
- Rouge Valley District Updates - Review of the information supplied for the Wayne County Rouge Valley communities showed that it was out of date and not in a consistent format. Considerable coordination time was necessary to gather and review base maps supplied by the Rouge Valley Communities, reduce the information as needed, and coordinate review with these communities. In addition, the initial evaluation runs had to be re-evaluated based on this updated information.
- WWTP/Suburban Statistics - The original scope did not address the provision of long term statistics at the DWSD WWTP and at suburban inflow points to the City of Detroit collection system. These statistics are now being included in the alternative's evaluation and the effort to perform this work added in the amendment.

Mr. Gary Fujita  
January 19, 1994  
Page 2

CAMP DRESSER & McKEE

- Flow Meter Error Analysis - The flow monitoring program was completed within the scope envisioned. However, review of this data showed some inconsistencies and potential problems. To review the possible data problems in this information, an error analysis was performed by TRC member Stephen Wright. Significant work has been performed to perform this work. This work, which is continuing, was recommended by the TRC.
  - Flow Meter Evaluation - Inconclusive data at "large pipe" metering sites has led to the re-installation of a flow meter in one of these sites, the HUF1 meter in the Hubbell sewer. CDM is providing dye testing support to establish actual flow rates understand whether extrapolation errors exist with the ADS meters in these type of installations. A portion of the work effort has been performed and a portion is yet to be completed and is included in the amendment. This work was recommended by the TRC.
  - Rainfall Analysis - Additional analysis of the rainfall direction and speed of storms was performed. This analysis included gathering NWS information on the subject and preparation of estimated directions and speeds. These will be used in the alternative analysis phase. This work was performed at the request of the TRC.
  - DCIA work - Initial estimates of impervious area were made by reviewing aerial photography for a number of sites throughout the DWSD service area. The calibration work yielded estimates of DCIA throughout the collection system area, as called for in the scope.
- Additional estimates were made using continuous simulations and available overflow records at several basins. These were not included in the original scope. In addition, the amendment includes, as recommended by the TRC, review of additional aerial photographs in additional locations as well as field reconnaissance in several areas where field data shows large variances from the model predictions. Also, there will be review of flow based DCIA estimates for several sites within Wayne County as part of this amendment. Each of these work items were recommended by the TRC.
- Rainfall Analysis - Review of the available rainfall data was performed to establish rainfall patterns, as called for in the original scope. Additional rainfall data will be collected to review the spatial and temporal impacts of certain alternatives as compared to a uniform rainfall. These additional spatial analysis of alternatives was not anticipated in the original scope of services. These work items were requested by the GDRS Technical Committee.

Mr. Gary Fujita  
January 19, 1994  
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CAMP DRESSER & MCKEE

- Additional Training - The original scope included model training. To perform this, three days of training was provided earlier in the project on the RUNOFF, EXTRAN, and STORM model. Training was also requested and provided for the flow metering software. This was not included in the original scope. Also, two half day training sessions are currently being provided. These training sessions were not anticipated in the original scope.
- Annual Overflow Estimate - The NPDES permit calls for placing estimates of the overflow volume and frequency at each of the permitted discharge locations. This will be done for the year by using the available rainfall information from this year to drive the continuous simulation model for existing conditions and meet this permit requirement. This work element was not included in the original scope of services.
- Notification of Overflow - This element is included to address the need to notify when overflows occur and the volume and duration of the expected overflow for a variety of storm events. This work element was scoped to include a series of design storm runs to establish a family of curves for storm volume and duration. This will be used to predict the overflow volume and duration. When rainfall occurs, these will be used to use the recorded rainfall volume and duration to place an estimate on the volume and duration of the expected the overflow.
- Additional Meetings Time Extension - The additional work items described above will result in the project end date being extended by six months. This will result an additional six technical meetings not anticipated in the original scope. Each of these meetings includes preparation and attendance time along with preparation of minutes for these meetings. Also, the one additional Policy meeting is anticipated at the end of the project for presentation of results.

If you have any questions about these scope items, do not hesitate to call Mark TenBrock of me at (313) 963-1313.

Very truly yours,

CAMP DRESSER & MCKEE



A. Barry Seymour, P.E., P.L.S.  
Senior Vice President

ABS/kak

UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

UNITED STATES OF AMERICA,

Plaintiff,

vs.

Civil Action No. 77-71100  
Hon. John Feikens

STATE OF MICHIGAN,

Defendant, Cross-  
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CITY OF DETROIT, a Municipal  
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THE FOOD AND ALLIED INDUSTRIES  
COMMITTEE OF METROPOLITAN DETROIT,  
a voluntary, non-profit, unincorporated  
association, and its Members

vs.

THE GREATER DETROIT CHAMBER OF  
COMMERCE, a Michigan non-profit  
corporation, and its Members.

---

PROOF OF SERVICE

STATE OF MICHIGAN)

)ss.

COUNTY OF WAYNE )



TO:

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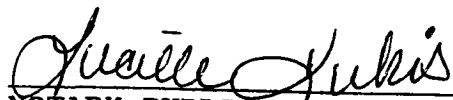
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WILLIAM W. MISTEROVICH, ESQ.  
Macomb County Department of  
115 S. Groesbeck Highway  
P.O. Box 806  
Mount Clemens, Michigan  
48043

MICHAEL POLSINELLI first being duly sworn, deposes and says that on the 3d day of August 1994, he served a copy of PROPOSED SUPPLEMENTAL ORDER RE: MATHEMATICAL MODEL OF SUBURBAN COLLECTION AND INTERCEPTOR SYSTEMS AND NOTICE OF SUBMISSION OF ORDER PER E.D. Mich. L.R. 58.1 upon the above-named persons after enclosing same in properly addressed, stamped envelopes and depositing same in a U.S. Mail receptacle for delivery thereon.

  
MICHAEL POLSINELLI

Subscribed and sworn to before me  
on this 3d day of August, 1994.

  
NOTARY PUBLIC, Wayne County, Mich.  
My Commission Expires:

LUCILLE KUKIS  
NOTARY PUBLIC - WAYNE COUNTY, MICH.  
MY COMMISSION EXPIRES 12-04-05



CITY OF DETROIT  
WATER AND SEWERAGE DEPARTMENT  
WATER BOARD BUILDING

735 RANDOLPH STREET  
DETROIT, MICHIGAN 48226-2830  
PHONE 313 • 224 • 4800/224 • 4801  
FAX 313 • 224 • 6067

August 12, 1994

Carol Cohron  
851 U.S. Courthouse  
Detroit, MI 48226

Re: USEPA v City of Detroit  
Case No. 77-77100  
Supplemental Order Re: Mathematical Model Of Suburban  
Collection And Interceptor Systems

Dear Ms. Cohron:

This Order was submitted to the Court and all counsel of record on August 3, 1994 under L.C.R. 58.1(c). No objections have been received. Please submit the Order to Judge Feikens for entry. Thank you for your assistance in this matter.

Very truly yours,

A handwritten signature in black ink, appearing to read "Robert C. Walter".

Robert C. Walter  
Assistant Corporation Counsel  
313-224-4752

RCW/trm